

REMARKS

Status of Claims

Claims 1, 2, 4, 6, 8, 9, 12, 13, 15, 17-19, 21, 23, 25, 28, 29, 31, 33 and 34 are currently pending in the application.

Claims 33 and 34 are rejected under 35 U.S.C. 112 , first paragraph.

Claims 33 and 34 are rejected under 35 U.S.C. 112 , second paragraph.

Claims 1, 15, 17 and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by US PG Pub 2002/0038118 to Shoham (hereinafter "Shoham"), or alternatively, as being obvious over Shoham.

Claims 1 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 7,040,033 to Zhu et al (hereinafter "Zhu").

Claims 2, 4, 6, 15, 19, 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoham, in further view of US 5,870,834 to Sheldon.

Claims 8, 9, 12-13, 18, 25 and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoham, in further view of Zhu.

Claims 33 and 34 have been cancelled because the Examiners requirement for new drawings is not clear or proper (for the reasons set forth below) and the application would be deemed abandoned if new drawings were not provided. The Claims may be reinstated in this application once the Examiner clarifies the basis for his request for drawings showing the features of these claims.

Claims 35 to 37 and 38 to 40 are respectively new apparatus and method claims, reciting respectively the various components and steps by which the currently claimed single additional sensor achieves the aim of providing a statistically acceptable indication of an erroneous output in the reading of said two or more of said sensors. Support for these claims is to be found in the second sentence of paragraph [0010] and in paragraphs [0045] to [0046] of the published application.

Examiner Interview Summary

Applicant's undersigned attorney expresses his gratitude for the courtesies extended during the telephonic interview conducted with the Examiner on April 25, 2012. During the interview, Applicant's attorney pointed out that the present claims were not suggested or disclosed by the cited prior art because the prior art does not have the "additional sensor" called for by these claims. It was also submitted that the Official Action simply reiterated virtually the identical rejections as set forth in the prior Official Action and, accordingly it was not possible for Applicant to ascertain the reasons that the amended claims did not overcome the prior art rejections. It was further submitted that the Examiner did not respond to the Applicant's request regarding the reasons the drawings were inadequate to support the rejected claims. The Examiner reviewed the Action as Applicant's attorney explained the reasons that the amended claims were not anticipated or obvious over the cited prior art, i.e., absence of the "additional sensor" called for in the claims. The Examiner generally agreed that the distinction overcame the prior art, but indicated that he would need to further study the amended claim before he could agree the claim was allowable. To further clarify the distinction over the prior art, Applicant's attorney proposed to amend claims 1 and 17 to make it clear that the "additional sensor" called for by the present claims is "not associated with any single one of said links.". The Examiner indicated that this amendment appeared to clarify the claim and asked that Applicant include this amendment in its response to the outstanding Official Action. This amendment is present in amended claim 1 and 17.

Claim Amendments

Claims 1 and 17 have been amended by the addition of the further limitation that the single additional sensor connected between said base member and said moving platform is "not associated with any single one of said links".

The applicant has carefully studied the outstanding Final Office Action. The proposed claims have been amended to more distinctly and clearly recite the features of the present invention claimed over the prior art cited. The present amendment is intended to be fully responsive to all points of rejection raised by the Examiner, and is believed to place the application either in condition for allowance, or in better form for consideration on appeal. The applicants believe that since the amendments made to claims 1 and 17 are of a minor nature, no further search is mandated, and this response should therefore be admissible. Entry of this response, favorable reconsideration and allowance of the application are respectfully requested.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The Examiner has stated that the drawings must show every feature of the invention specified in the claims. Therefore, the Examiner requests that the claimed subject matter of claims 33 and 34 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

The Examiner has not made clear exactly which features of claims 33 and 34 he believes to be missing from the claims. If the Examiner is referring to the limitation regarding the verification having a statistically insignificant probability of falsehood, then Applicant is unclear how this outcome, arising from a purely descriptive feature of the level of reliability of a sensor could be shown in a drawing, or how the effect could be shown in a flow diagram, and would appreciate the Examiner's guidance thereon. For this reason, claims 33 and 34 have been canceled in order to avoid abandonment of the application. The subject matter of these claims is disclosed in the last sentence of the Abstract, and in lines 7-13 of paragraph [0010] of the published application - nothing further is required. The level of reliability of the sensor cannot be shown in a drawing, nor does the MPEP require a drawing for this feature (see below). Applicant intends to reinstate these claims in this application once the Examiner has explained why and whether these drawings are required and what aspect or element of the claims is to be shown in the new drawings.

Furthermore, it is respectfully submitted that the Examiner's requirement for new drawings to support claims 33 and 34 is unjustified. In MPEP 601.01(f), it is stated that:

"It has been USPTO practice to treat an application that contains at least one process or method claim as an application for which a drawing is not necessary for an understanding of the invention under 35 U.S.C. 113 (first sentence)."

Since the present application does include at least one method claim, it appears to the best understanding of the Applicant that the drawings currently filed go beyond the requirement of the Office, and that even if the Applicants were able to show the subject matter of claims 33 and 34 in a drawing, they would not be required to do so.

Applicant therefore respectfully requests withdrawal of the Examiner's objection to the drawings or, as an alternative, an explanation of what the requested new drawings should depict. Should the Examiner nevertheless assert that the drawings are incomplete, the Applicant would appreciate more specific formation of what the Examiner is requesting, and why any new drawing figures are required in light of MPEP 601.01(f). Upon receiving this information, the Applicant may reinstate claims 33 and 34 in this application.

Claim Rejections - 35 U.S.C. § 112, first paragraph.

The rejection of claims 33 and 34 under 35 U.S.C. § 112 first paragraph is believed to be Moot in view of the cancellation of these claims. The Applicant intends to reinstate these claims once the Examiner clarifies whether new drawings are required at all and what such new drawings should depict (that is not already present in the other drawing figures), and the question of the rejection of claims 33 and 34 under 35 U.S.C. § 112 first paragraph will then be addressed.

Claim Rejections - 35 U.S.C. § 112, second paragraph.

The Applicant believes that the Examiner's rejection of claims 33 and 34 under 35 U.S.C. §112, second paragraph is moot in view of the cancelation of these claims pending an explanation of the Examiner reasons for requiring new drawings to support these claims. On receipt of that explanation, and should claims 33 and 34 be reinstated, the Applicant will then address the question of the rejection of claims 33 and 34 under 35 U.S.C. § 112 second

paragraph. As set forth above, the subject matter of these claims is disclosed in the last sentence of the Abstract, and in lines 7-13 of paragraph [0010] of the published application.

Claim Rejections Under 35 U.S.C. § 102(b)

The Examiner has rejected claims 1, 15, 17 & 31 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Shoham US PG Pub 2002/0038118. The Examiner states that:

"Regarding claims 1 & 17 where it is disclosed by Shoham to have both the apparatus and method of control a hybrid-parallel robot using position sensors(*sic*). This is read upon by applicant's claim as indicated below:

"A robot comprising: a base member; a moving platform operative as the end effector of the robot [figure 2]; a plurality of adjustable links connecting said base member to said moving platform [figure 2], the status of each of said adjustable links being known by means of a sensor associated with each of said links [paragraph 24], the combined outputs of said plurality of sensors indicating the pose of said platform [paragraphs 24-28]; and a single additional sensor connected between said base member and said moving platform [paragraph 24], wherein said single additional sensor provides an indication of an erroneous output in the reading of any one of said plurality of sensors [paragraph 24]." However if applicant finds that it is not inherently disclosed by Shoham to have an additional sensor, then the mere duplication of part by one of ordinary skill in the art is considered to be capable by one of ordinary skill in the art and hence it would have been obvious to have an additional sensor for redundancy purposes and also to increase accuracy of the device."

Applicant respectfully disagrees with the Examiner's interpretation of what is shown in the Shoham prior art. In Fig. 2 of Shoham and its associated description in paragraphs [0024] to [0028], there are indeed shown all of the first three elements of claim 1 of the present application, as cited by the Examiner. However, **all of the sensors** shown in Fig. 2 of Shoham - the sensors being incorporated within the actuators 80, as described in paragraph [0024] - are essential for indicating the pose of the platform, which is obtained from their combined outputs,

and **no additional sensors whatsoever** are shown in Fig. 2. Furthermore, each of those sensors shown is associated with one of the links, and no unassociated sensors whatsoever are shown.

Therefore, Applicant respectfully submits that the Examiner's assertion that Fig. 2 of Shoham also shows "a single additional sensor connected between said base member and said moving platform" is completely unfounded. Applicant therefore submits that claim 1 is not anticipated by Shoham, and respectfully requests withdrawal of the rejections under 35 U.S.C. 102(b). Similar arguments can be made regarding the rejection of claim 17, and Applicant also respectfully requests withdrawal of the rejection of claim 17 under 35 U.S.C. 102(b)

Applicant also respectfully disagrees with the Examiner's alternative assertion as applied to these claims, that the mere duplication of parts by one of ordinary skill in the art is considered to be capable by one of ordinary skill in the art and hence it would have been obvious to have an additional sensor for redundancy purposes and also to increase accuracy of the device.

In the first place, nowhere in claim 1 is there recited that the additional sensor is for redundancy purposes or for increasing the accuracy of the device, such that the Examiner's rejection does not relate directly to the claims on file. Furthermore, Applicant submits that nowhere in claim 1 of the present application is there shown any element that can be considered to be the "mere duplication of parts". In claim 1, there are recited a plurality of sensors, **each of which is associated with one of the plurality of links** which actuate the platform of the robot. The additional sensor is therefore not a mere duplication of the plurality of sensors, since it is not associated with any single one of the links, and *per se*, does not participate with the sensors associated with the links in indicating the pose of the platform. If the additional sensor were to be associated with a link – as indeed exists in some of the prior art, where each link has an additional sensor for back-up purposes – then the argument of mere duplication may be tenable, since the additional sensors merely duplicate the action of the primary sensors associated with each link. Furthermore, the additional sensor recited in claim 1 is connected between the base and the platform, without any limitation as to the point of connection, which too distances it from being mere duplication of parts.

Applicant derives support for these arguments from the Examiner's assertion in the last three lines of paragraph 11 of the Office Action, where the Examiner states that "it has been held that mere duplication of the essential working part of a devise (sic) **i.e., extra sensor on leg,**

involves only routine skill in the art. *St. Regis Paper Co. Vs Bemis Co.*, 193 USPQ 8; 549 F 2d. 833 7th circuit, 1977." (Emphasis added.) If the extra sensor of the present claimed invention were indeed mounted on the leg of the robot, then the Examiner's assertion regarding the mere duplication of parts may have had some basis, but nowhere in the present invention, as claimed in claim 1, is there any indication that the additional sensor is associated with one of the links of the robot. In fact, there is no hint of such an arrangement of an additional sensor not associated with any single one of the links in any of the cited prior art. Consequently, in order to distance claim 1 even more from the prior art, and consistent with the discussion during the interview, claim 1 has been further amended to include the additional limitation that the additional sensor is "not associated with any single one of said links".

Furthermore, claim 1 has been previously amended to includes the additional limitation that the "single additional sensor provides an indication of an erroneous output in the reading of any one of said plurality of sensors". Applicant respectfully submits that this limitation further differentiates amended claim 1 from the assertion that the additional sensor is mere duplication of parts. If two sensors were used on a link of a robot instead of a single sensor, as would be understood by the above mentioned comment by the Examiner in paragraph 11 of the Office Action, then that may perhaps be considered to be mere duplication of parts, and would result in the indication of an erroneous output in the reading **only** of the sister sensor whose output was being duplicated by the additional sensor.

However, amended claim 1 recites that the "single additional sensor provides an indication of an erroneous output in the reading of **any one of said plurality of sensors**". (Emphasis added.) In other words, the additional sensor recited in amended claim 1 is able to provide an indication of a failure in any one of the other sensors, and therefore, cannot be considered to be mere duplication since it does not achieve the same effect as that of the other sensors. This feature is not disclosed or suggested in the prior art that has been cited in this application, and Applicant asserts that the *St. Regis* case is inapposite, in that it dealt with duplicating what had previously existed in the prior art. In the instant case, amended claim 1 defines an element of the invention that has not previously existed and which provides benefits over the prior art that would not be obtained by mere duplication of parts, such as the doubling up of every sensor on each link. Although these arguments have already been presented in the

previous amendment filed on August 22, 2011, the Examiner did not provide any response to refute it, or to explain why he considers the arguments to be untenable. The Applicant earnestly requests such an explanation in the Examiner's response hereto.

Applicant therefore respectfully submits that currently amended claim 1 is neither anticipated by, nor is obvious in view of Shoham, and respectfully requests withdrawal of the Examiner's rejection thereof. Similar arguments can be submitted regarding claim 17 and the Applicant also respectfully requests withdrawal of the rejection thereof.

The Examiner has also rejected claims 1 & 17 under 35 U.S.C. 102(c) as being anticipated by Zhu et al., US Patent 7040033 B2 (hereafter referenced as Zhu). The Examiner states that:

"Regarding claims 1 & 17 where it is disclosed by Zhu to have, "A robot comprising: a base member [figs 2-4]; a moving platform operative as the end effector of the robot [figs 2-4]; a plurality of adjustable links connecting said base member to said moving platform [figs 2-4], the status of each of said adjustable links being known by means of a sensor associated with each of said links [figs 2-4], the combined outputs of said sensors indicating the pose of said platform [figs 2-4]; and a single additional sensor connected between said base member and said moving platform [figs 2-4]."

Applicant respectfully disagrees with the Examiner's interpretation of what is shown in Zhu. Nowhere in Zhu is there shown a robot. The apparatus and method described in Zhu is for measurement only, and is intended for calibrating the motion of moveable parts, such as a machine tool or similar. To the best of the instant Applicant's understanding, the Zhu apparatus comprises a base and a platform, connected by telescopic rods, each of which incorporates a displacement sensor such as a linear encoder. The signals from the linear encoders are used to determine the relative pose of the base and the platform, which can then be used to check the accuracy of the mutual motion of parts of, for instance, a machine connected to these two elements.

However, even if the Zhu apparatus were to be fitted with activators to convert it into an operating robot, (Fig. 4 of Zhu then being a copy of the Stewart-Gough parallel robotic manipulator), something which the Applicant again emphasizes that it is not, **all of the sensors**

shown in Zhu are utilized in defining the relative pose of the base and platform, and nowhere is there anywhere shown or suggested an additional sensor, as claimed in amended claim 1 of the present application. In short, there is nothing in the cited prior art that would have provided any reason or motivation to add an additional sensor. Further arguments as presented above regarding the Shoham prior art, can also be applied to any such possible derivation of Zhu.

Applicant therefore respectfully submits that amended claim 1 is not anticipated by Zhu, and respectfully requests withdrawal of the Examiner's rejection under 35 U.S.C. 102(e). Similar arguments can be submitted regarding claim 17 and the Applicant also respectfully requests withdrawal of the rejection thereof.

Claim Rejections - 35 U.S.C. § 103(a)

Claims 2, 4, 6, 15, 19, 21 & 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoham in further view of Sheldon US Patent 5,870,834.

Claims 8, 9, 12-13, 18, 25 and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoham, in further view of Zhu.

Applicant respectfully submits that claims 2, 4, 6, 8, 9, 12-13, 15, 18-19, 21, 23, 25 and 28-29, are all variously dependent from either of amended claims 1 or 17, and recite additional patentable subject matter. Since amended claims 1 and 17 are deemed allowable, Applicant submits that these claims should also be deemed allowable.

Additionally, new claims 35 to 37 and 38 to 40 are also respectively dependent from amended claims 1 or 17, and recite additional patentable subject matter. Applicant submits that claims 35 to 40 should also therefore be deemed allowable

Response to Arguments

The examiner has stated that Applicant's arguments with respect to claims 1 to 34 have been considered but are moot in view of the new ground(s) of rejection.

The Applicant respectfully disagrees with the examiner's assertion that the so-called "new ground(s) of rejection", which relate only to claims 33 and 34, entitle the examiner to completely

ignore Applicant's arguments, and to issue an Office Action whose only difference from the previous Office Action is essentially the replacement of the 35 USC 112 rejections of now cancelled claims 10 and 26 with identical 35 USC 112 rejections of claims 33 and 34, which are merely restatements of claims 10 and 26 in a manner which the applicant believes makes the subject matter thereof allowable. Not only has the Examiner not related his rejections at all to the main body of claims, but the rejections of all of the claims, and not just 33 and 34, were made over identical prior art to that cited in the previous Office Action dated 22 March, 2011. The Examiner has not given any new reasons to support his rejections over the same prior art, and Applicant therefore submits that without an adequate response to the Applicant's arguments, the Examiner's present Office Action is incomplete and improper, and runs contrary to the spirit of fair-minded examination. If the Examiner again reiterates the same rejection, it is respectfully requested that he specify the features said to be present in the cited prior art and also identify the column and line of the reference in which the alleged limitation is found.

Conclusion

In view of all of the above arguments, entry, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below. This response is accompanied by a Request for Continued Examination.

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US

The fee for the Request for Continued Examination and a Petition for Extension of Time is being paid concurrently herewith on the Electronic Filing System (EFS) by way of Deposit Account authorization. Please apply any necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: May 1, 2012/

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